avalanche prone areas that affect troops movement in western Himalayan region have been registered by SASE.

(c) and (d) Yes, Sir. There are methodologies by which landslide-vulnerable zones can be demarcated. GSI has already completed inventory of about 1150 landslides spread over north eastern states, northeast and north west Himalayas, western ghats and Nilgiri hills. GSI is also engaged in carrying out landslide hazard zonation mapping on different scales to demarcate the landslide prone hilly terrain into different zones according to their degree of susceptibility to landslides. The main purpose of this study is to guide the planners regarding the land use pattern.

The risk reduction due to avalanches is attempted by the following methods:

(i) Avalanche Awareness

(ii) Avalanche Forecasting

(iii) Avalanche Control

Regular Avalanche forecasting bulletins are issued from SASE to people living in avalanche prone areas about impending danger. Civilian population living in the interior region of Himalayas are also informed through Press Information Bureau and local broadcasting stations about the impending danger.

Study on global warming

†2108. SHRI JAI PARKASH AGGARWAL: Will the Minister of EARTH SCIENCES be pleased to state:

(a) whether any scientific study on impact of global warming on climate changes, has been conducted;

(b) whether various parts of the country have witnessed such extreme conditions of climate such as tsunami, excessive rains, and drought because of this impact;

(c) if so, the details of areas most affected by climatic changes; and

(d) the details of international deliberations on this issue, various aspects concerning its prevention, and consensus arrived at various fora to overcome its impact?

†Original notice of the question was received in Hindi.

THE MINISTER OF EARTH SCIENCES (SHRI KAPIL SIBAL): (a) Yes, Sir. Many scientific studies on global warming and climate change issues have been made by the scientists of the India Meteorological Department and the Indian Institute of Tropical Meteorology. The studies include, long term trends of temperature and rainfall over different parts of the country, changes in extreme weather events like heat and cold waves and heavy precipitation and trend in tropical cyclone activity over North Indian Ocean.

(b) and (c) There has been an increase in the extreme weather conditions like cyclones, heavy rainfall and drought due to global warming in last 15 years. However, no specific change has been noticed in India except a few events like Mumbai deluge of 2005 or excessive rainfall in Rajasthan in 2006. During the past 100 years, mean temperature over the country (India) has increased by 0.5°C. However, there is no appreciable change in the annual rainfall averaged over the country as a whole.

(d) The Inter-Governmental Panel on Climate Change (IPCC) working under the aegis of the United Nations has submitted its Summary Report on Working Group (WG)-I entitled "Climate Change 2007: The Physical Science Basis".

The main conclusions of the WG-I Panel Report are:

* Global atmospheric concentrations of carbon dioxide, methane and niturous oxide have increased markedly as a result of human activities since 1750 and now far exceed pre-industrial values determined from ice cores spanning many thousands of years. The global increases in carbon dioxide concentration are primarily due to fossil fuel, land-use change, while those of methane and nitrous oxide are primarily due to agriculture. Wide spread melting of snow and ice, and rising global average sea level has been reported.

* To the report, anthropogenic warming and see level rise would continue for centuries due to time scales associated with climate processes and feedbacks, even if greenhouses gas according concentrations were to be stabilized.